DETAILED ACTION

This Office Action is in response to the communications received April 9, 2008. Claims 1, 2 and 6 are now under consideration.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over in Sawada et al. (US 5,404,032) view of Kuroda et al. (US 5,831,296).

Regarding claim 1, Sawada et al. shows (e.g. Figure 4) a compound semiconductor epitaxial substrate for use in a strain channel high electron mobility field effect transistor, comprising:

an InGaAs layer [21] as a strain channel layer; and

an AlGaAs layer [5] containing n-type impurities as an electron supplying layer;

wherein GaAs layers [2,22] having a thickness of 4 nm of more [column 4: lines 55-56, 61-63] each are laminated respectively in contact with a top surface [shown] and a bottom surface [shown] of said strain channel layer [21];

wherein said GaAs layer [2] in contact with the bottom surface of said strain channel layer is a spacer layer [in keeping in line with a broadest reasonable interpretation, a “spacer” layer is interpreted to mean that GaAs layer 2 physically acts

as a spacer, thereby defining a particular distance between the substrate 1 and the strain channel layer 21].

Sawada does not disclose wherein said InGaAs layer has an electron mobility at room temperature of 8300 cm^2 / V*s or more. Kuroda shows wherein said InGaAs layer has an electron mobility at room temperature of 8300 cm^2 / V*s or more [column 5, lines 5-17]. Kuroda states that $In_YGa_{1-Y}As$ will have at least a value of between 8500 and 33000, especially if y<0.3 [column 5: lines 5-17], which Sawada does show [column 4: lines 55-60]. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention that the semiconductor layer of Sawada would have the electron mobility specified by Kuroda, as it is known in the art that the specified material could have an electron mobility at room temperature of 8300 cm^2 / V*s or more with the required y value.

Regarding claim 2, although not shown by Sawada, it is clearly shown by Kuroda et al. that it is possible and evident that the compound semiconductor epitaxial substrate according to claim 1, as shown in Figure 3a, wherein the InGaAs layer constituting said strain channel layer [24] has an Indium composition of 0.25 or more [column 5, lines 5-17].

Regarding claim 6, Sawada in view of Kuroda shows the compound semiconductor epitaxial substrate according to claim 1.

The embodiment of Figure 4 of Sawada does not show wherein said GaAs layer laminated in contact with the top surface of said strain channel layer is a non-doped layer.

The embodiment of Figure 10 of Sawada does show wherein said GaAs layer [62] laminated in contact with the top surface of said strain channel layer [61] is a non-doped layer [shown].

The disclosure of Sawada discusses the intent of two modes of delivering an improved device, column 2, lines 48-60, "the invention has two electron transport modes: wherein the gate potential is deep, electrons mostly travel through the undoped semiconductor layer; when the gate potential is shallow, electrons mostly travel through the highly doped layer." So the embodiment of Figure 4 uses the GaAs layer on a top surface of a strain channel layer, which is the mode where electrons mostly travel through the highly doped layer (e.g. the top GaAs layer). However, it is taught alternatively that, an undoped layer above the strain channel layer, will provide the benefit of making the device, "less susceptible to the effects of impurities, thus achieving further suppression of noise, and hence superior low-noise performance".

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the top GaAs layer as being undoped in the system of the embodiment of Figure 4 of Sawada in view of Kuroda as suggested by the embodiment of Figure 10 of Sawada, for the purpose to suppress noise and have superior low-noise performance.

Response to Arguments

In regard to the arguments on page 4 and the top of page 5, that Sawada does not show that layer 2 "serves as a buffer layer", the Applicant's Representative relies upon evidence of an embodiment (as evidenced by the Representative's use of element

numbers 51 and 52, and the disclosure, "*see* col. 3, line 63, col. 6, lines 55-64 and Fig. 9") which is not relied upon by the Examiner to make the rejection. Therefore the evidence provided is not relevant to the current discussion. Next, the claim limitation merely requires that the GaAs layer (2 of Figure 4 of Sawada), "is a spacer layer". The GaAs layer (2 of Figure 4 of Sawada) clearly meets this limitation, and also, in keeping in line with a broadest reasonable interpretation, a "spacer" layer is interpreted to mean that GaAs layer 2 physically acts as a spacer, thereby defining a particular distance between the substrate 1 and the strain channel layer 21.

It is noted that the arguments include assertions that a "buffer layer" is not shown, but as this language is not present in the claims, this assertion is moot.

In regard to the arguments on page 5, it is clear that Kuroda does teach the electron mobility for the specific material of Sawada, as shown in the rejection, therefore Kuroda does in fact remedy the deficiency by showing the mobility of the exact same material of Sawada.

Fax / Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDUARDO A. RODELA whose telephone number is (571)272-8797. The examiner can normally be reached on M-F, 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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